

## Taxonomical Characteristics of Tropical Species of *Xylaria* Collected from Taiwan

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### 대만산 *Xylaria*속 열대종의 분류학적 특성

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**ABSTRACT:** Three species of the genus *Xylaria* are recognized on Taiwan materials: *X. allantoidea* (Berk.) Fr. and *X. obovata* (Berk.) Fr.; including one new record *X. curta* Fr., having 9.0-10.8×3.9-5.4 μm ascospores, in Taiwan. The collection of *Xylaria allantoidea* from Taiwan is compared to other collections in morphological characters. The species are described from the host and in culture by a bright microscope and a scanning electron microscope.

**KEYWORDS:** *Xylaria allantoidea*, *X. obovata*, *X. curta*, Taiwan

Many fungi in the genus *Xylaria* have recently been described from Taiwan (Ju and Tzean, 1985). These fungi have mostly demonstrated their ability to cause white rot or soft rot decay of wood under laboratory conditions (Lee, 1997). Ju and Tzean (1985) reported 17 *Xylaria* species, including 15 new recorded species and 2 previously recorded *Xylaria* species (Sawada, 1928, 1931), and especially 2 *Xylaria* spp. nov. and 1 *Xylaria* var. nov. were erected to accommodate their unique morphological characters. Therefore, Ju and Tzean (1985) proposed a key to aid identification by using the characteristics in Taiwan. Recently, Lee (1997) described *X. allantoidea* and *X. obovata* from Malaysia in the field of taxonomy, host and habitat consideration and world distribution. These two species from Taiwan compared with species from Malaysia. This paper deals with three species of *Xylaria* in Xylariaceae collected in Taiwan for the addition of taxonomical characteristics.

### Materials and Methods

Each description was based on a macro- and microscopical analysis of the materials collected from Kenting in Taiwan. To observe ascospores and asci squash slides were made from fresh ascomata. For staining of apical apparatus of the ascus Melzer's reagent was used.

The measurements based on samples of 20 fully mature ascospores are presented length×width±standard devi-

ation.

### Taxonomy

#### Key to *Xylaria* species in Taiwan

1a. Ascospores over 20 μm length

*Xylaria obovata* (Berk.) Fr.

1b. Ascospores less than 20 μm length 2

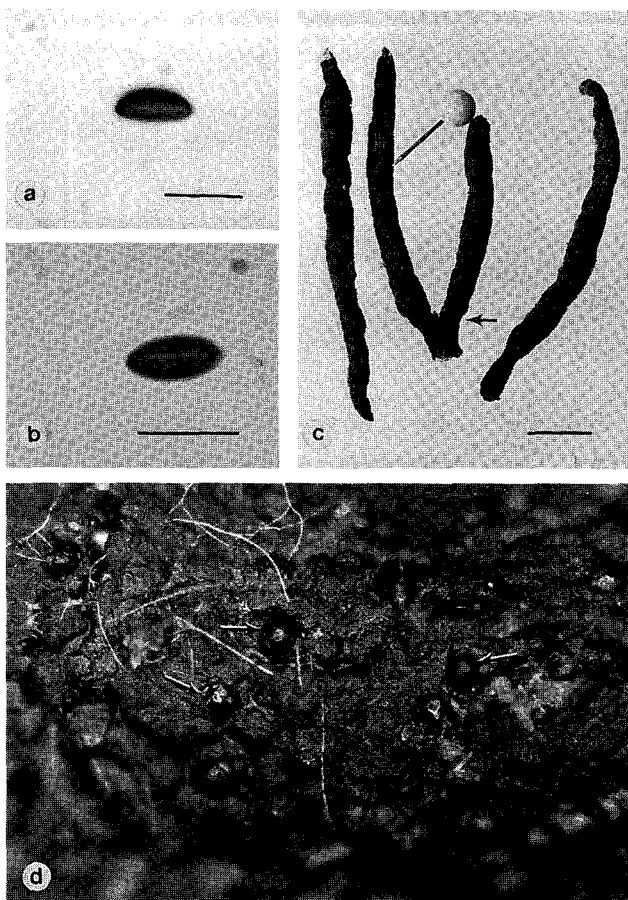
2a. Perithecia completely immersed, ostiole punctate becoming papillate, less than full germ slit on the ventral side of the spore. *Xylaria allantoidea* (Berk.) Fr.

2b. Stromata externally rough, cracked into round scales, ascomata immersed to protruding, ostiola protruding and papillate *Xylaria curta* Fr.

*Xylaria curta* Fr., Nova Acta Regiae Soc. Sci. Upsal. (ser.3) 1: 126

This fungus is recorded newly in Taiwan. Stromata cylindrical, solitary to simple cluster on pandore enlarged bases, unbranched, with fertile rounded apices or fertile tapering apices, and short to long stipes, 3-5.5 cm total height×0.3-0.5 cm diameter, Ectostroma rough, cracked into rounded or angular scales, surrounding erumpent perithecia sometime covered with yellowish sloughing scales, dark brown to shining dark black with age. Stromata sometime splitting longitudinally and becoming enrolled. Endostroma white, becoming hollow with age. Ascomata immersed to protruding, globose to subglobose. Ostiola protruding, papillate. Ascospores brown and smooth, uniseriate to obliquely uniseriate, inaequilaterally ellipsoid

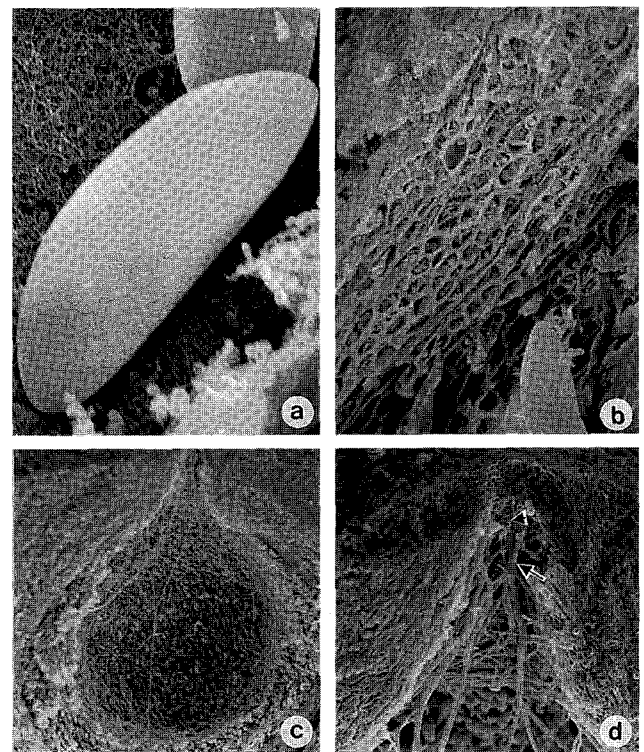
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**Fig. 1.** Light micrographs of *Xylaria curta*. a, b. Ascospores with longitudinal 3/4 to full germ slit (bars: 5  $\mu$ m). c. Stromata cylindrical with fertile rounded or tapering apices, and short to long stipe, branched (arrowed) or unbranched (20 mm). d. Roughen surface of stromata with wet mass of ascospores covered ostiole (arrowed).

with rounded ends, 9.0-10.8 ( $9.54 \pm 0.64$ )  $\times$  3.9-5.4 ( $4.56 \pm 0.42$ ). Asci and paraphyses unfounded.

Note: The name *X. curta* applies to stromata of *X. feejeensis* and its similar ascospores. However, it usually at first covered with a thin white crust and later cracks scaled between the ostiola papillate. According to Laessle (1987) there were extensive misapplications of the name, *X. corniformis*, *X. castorea*, *X. longipes* var. *microspora*, *X. feejeensis* subsp. *faveolis*, *X. alpina* and *X. curta*, characterized by the presence of the pronouncedly white



**Fig. 2.** a, b. Scanning electron micrographs of *Xylaria obovata*. a. Very smooth ascospore showing inequilateral ellipsoidal shape but no trace of germ slit. b. Structure of ascogonia showing very thin-walled prismatic texture in small size. c, d. Scanning electron micrographs of *Xylaria allantoidea*. c. Globose to subglobose perithecia containing mass of ascospores with absolutely immersed neck of perithecia. d. Higher magnification of neck (arrowhead), having texture element (arrowed) perithecia.

to yellow ectostromal squamules. This tropical collection greatly resembles the collection examined by van der Gucht (1994b), but differs from its having sloughing scales.

*Xylaria allantoidea* (Berk.) Fr., *Nova Acta Regiae Soc. Sci. Upsal. (ser.3) 1: 127 (1851)*

Morphological characteristics: Stromata unbranched solitary or only branched near the base in small clusters, cylindrical allantoidea to cleavage with obtusely rounded, having often ill-defined and short stout stipes, 4-8 cm long and 2-3.5 cm in diameter. Surface of stroma very shiny

**Table 1.** Comparison of morphological characteristics of *Xylaria allantoidea* in literatures

	Dennis (1961)	Ju & Tzean (1985)	van der Gucht (1994)	Lee (1997)
Habitats	on decayed log and dead stump	on dead wood	on dead decorticated wood	on dead wood
Stromata	not described	unbranched	solitary or small clusters	unbranched or simple branched
Ascospores	11-16 $\times$ 3.5-5 $\mu$ m	11-14 $\times$ 3.5-4.5 $\mu$ m	12-14.5 $\times$ 3.5-5 $\mu$ m	13.5-16.5 $\times$ 4.8-6.3 $\mu$ m
Asci	not described	not measured	145-195 $\times$ 6-7 $\mu$ m	not found
Origin	Africa	Taiwan	New Guinea	Malaysia

and carbonaceous, reddish brown to dark brown with age, smooth and hairless. Interior of stroma whitish beige to hollow, sometimes longitudinally splitting in the middle parts of clavata, the texture becoming hard with age. Perithecia completely immersed, subglobose to globosical obpyriform, having short neck. Ostiole mainly punctate, becoming papillate, occasionally having annulate disc. Ascospores uniseriate, inequilaterally ellipsoid to oblong-navigular, with narrowly rounded ends, light brown to brown, smooth,  $13-16 \mu\text{m} \times 5.3-7.0 \mu\text{m}$  with straight full germ slit.

Cultural characteristics: Colonies fast grew on malt extract, reaching ca. 9 cm diameter petri dish in a week. At the first whitish light orange, becoming yellowish dark grey mycelium with age. Later reverse color to dark brown toward center.

Note: Although this fungus collected from Taiwan, having larger ascospores,  $13.5-16.5 (14.6 \pm 0.88) \times 4.8-6.3 (5.79 \pm 0.55) \mu\text{m}$ , differs in the ascospores, to other collection (Table 1), it shows typical type of *X. allantoidea* (Dennis, 1961; Ju and Tzean, 1985; van der Gucht, 1994a). Table 1 shows the diagnosis of *X. allantoidea* from other collections. These fungi have mostly collected on dead wood (log) well decayed. Dennis (1961) recognized the difficulty in delineating taxa of this group. However, recently van der Gucht (1994a) separated species based on their teleomorphic and anamorphic characteristics.

***Xylaria obovata* (Berk.) Fr., Nova Acta Regiae Soc. Sci. Upsal. ser 3(1): 127**

Morphological characteristics: Stromata unbranched, obovate to oval-clavate, sessile to short-stipitate, 2-5 cm in total height and 0.5-1.5 cm in width, rounded fertile portions apices, sometime short stipes well-defined, hairless. Surface of stroma smooth, shiny dark brown to black in dry stage, with grayish brown scales, crust carbonaceous and very hard with ages. Interior inner cream, solid or becoming hollow, disintegrating at the center when mature with ages. Ascomata globose to subglobose or crescent-shaped, absolutely immersed. Ostiola dotted, or inconspicuous. Ascospores smooth, brown to dark brown, inequilateral ellipsoid  $36.0-38.5 \times 8.5-9.5 \mu\text{m}$ , with less than full germ slit.

Cultural characteristics: Colonies fast glowing on malt extract agar, reaching ca. 9 cm diameter in 10 days, at first hyaline then white and zonate. In a month anamorph-

ic stroma produced, cylindrical to clavate, somewhat fragile and becoming brownish black.

Note: Dennis (1956) considered *X. obovata* a tropical form of *X. polymorpha*, concerning of similar ascospores and morphology. Recently, Callan and Rogers (1990) stated that *X. obovata* was not a member of the tropical *X. polymorpha* species complex with the aspects of anamorphic consideration. This collection of *X. obovata* is similar to that of described by Ju and Tzean (1985), Dennis (1956) with the exception of the longer ascospores. However, Lee (1997) described a species of *X. obovata* have large ascospores ( $36 \times 9 \mu\text{m}$ ).

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